DOCUMENT RESUME

ED 329 705 CE 057 141

TITLE Vocational Education Tool and Equipment Inventory. April 1988 Update.
INSTITUTION Pennsylvania State Dept. of Education, Harrisburg.
PUB DATE Apr 88
NOTE 53p.
PUB TYPE Reports - Research/Technical (143) -- Tests/Evaluation Instruments (160)

EDRS PRICE MF01/PC03 Plus Postage.
DESCRIPTORS Community Colleges; *Educational Finance; Educational Needs; *Equipment; *Program Effectiveness; *Purchasing; Regional Schools; Secondary Education; *State Legislation; Technological Advancement; Two Year Colleges; *Vocational Education; Vocational Schools
IDENTIFIERS Area Vocational Technical Schools; *Pennsylvania

ABSTRACT

A study was conducted to determine if the Pennsylvania vocational education system could deliver cost-effective training needed by business and industry and to establish the adequacy of tools and equipment for this purpose. Information was obtained from a multiple-item survey sent to 71 area vocational schools, 61 comprehensive high schools, and 14 community colleges that received funds under the distribution procedures established in Act 1984-107. Some of the results of the 144 responses are the following: (1) new equipment proposals are made to the governing board as required; (2) tools increased in value about 50 percent over the last 3 years since passage of the act; (3) all program areas reported increases in overall tool and equipment values, except in area vocational schools' agriculture and business programs; (4) largest increases in tools were reported in the program areas of trade and technical education; and (5) increases were shown in uses of robotics, word processing, laser technology, computer-aided design, and biotechnology. The study concluded that the act had no effect on the ways institutions fund tool purchases, that monies generated by the act were used to replace monies lost to federal cutbacks, and that private sector funds for tools doubled but fell short of meeting the increased needs being experienced by the institutions. (Appendices include the survey form and a table of allocations and expenditures by area schools and community colleges.) (KC)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

817

ED329705

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

R R Bradley

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

BEST COPY AVAILABLE

CE057 141

Vocational Education Tool and Equipment Inventory

Pennsylvania Department of Education • April 1988 Update

Vocational Education Tool and Equipment Inventory

Commonwealth of Pennsylvania
Robert P. Casey, Governor

Department of Education
Thomas K. Gilhool, Secretary

Office of Basic Education
Donna D. Wall, Commissioner

Bureau of Vocational and Adult Education
Jacqueline L. Cullen, Director

Division of Vocational Education Planning,
Development and Evaluation Services
William J. Reilly, Chief

Pennsylvania Department of Education
333 Market Street
Harrisburg, PA 17126-0333

April 1988

The Pennsylvania Department of Education will not discriminate in its educational programs, activities or employment practices, based on race, color, national origin, sex, age, religion, ancestry, handicap, union membership or any other legally protected classification. Announcement of this policy is in accordance with state and federal laws, including Title IX of the Education Amendments of 1972, and Sections 503 and 504 of the Rehabilitation Act of 1973.

Employees and participants who have an inquiry or complaint of harassment or discrimination, or who need information about accommodations for handicapped persons, should contact Susan Mitchell, Affirmative Action Officer, Pennsylvania Department of Education, 333 Market Street, Harrisburg, PA 17126-0333 (717-787-1953).

For additional copies of this publication, please contact Clarence A. Dittenhafer, telephone number 717-783-6867.

TABLE OF CONTENTS

	Page
CHAPTER I. INTRODUCTION	1
Background	1
Statement of the Problem	1
Questions to be Answered	1
CHAPTER II. METHODS	3
Instrumentation	3
Sample	3
Survey Procedures	3
Data Analysis	5
Limitation of the Study	5
CHAPTER III. RESULTS	6
Question 1	6
Question 2	9
Question 3	20
CHAPTER IV. DISCUSSION AND CONCLUSIONS	26
Question 1	26
Question 2	27
Question 3	28
Conclusions	29
APPENDIX A: VOCATIONAL EDUCATION TOOLS AND EQUIPMENT INVENTORY (FOLLOW-UP)	30
APPENDIX B: PARTICIPATING EDUCATION AGENCIES SHOWING ALLOCATIONS AND EXPENDITURES THROUGH JANUARY 1988	35
APPENDIX C: EXPLANATORY LETTER TO ACCOMPANY SURVEY	39
APPENDIX D: FOLLOW-UP LETTER TO NONRESPONDENTS	40

LIST OF TABLES

Table		Page
1.	Sampling Matrix of Agencies Provided Vocational Education Tools and Equipment Funds Through Act 1984-107	4
2.	Selected Fiscal Characteristics of Tools and Equipment Needed to Provide Vocational-Technical Education at AVTSs by Program Area	12
3.	Selected Fiscal Characteristics of Tools and Equipment Needed to Provide Vocational-Technical Education at High Schools by Program Area	13
4.	Selected Fiscal Characteristics of Tools and Equipment Needed to Provide Vocational-Technical Education at Community Colleges by Program Area	14
5.	Selected Fiscal Characteristics of Tools and Equipment Needed to Provide Vocational-Technical Education in Pennsylvania by Program Area	15

LIST OF ILLUSTRATIONS

Figure		Page
1.	Systems Used by Institutions to Replace and Update Tools and Equipment	7
2.	Funding Sources Used by Institutions to Pay the Cost of Replacing Tools and Equipment	8
3.	Mean Percentage of Tools and Equipment Cost Paid from Available Sources by Institution	10
4.	Percentage of Vocational Tools and Equipment Needs Presently Being Met at Institution	11
5.	Implementation of Specific Advanced Technologies in Vocational Programs at Area Vocational-Technical Schools	21
6.	Implementation of Specific Advanced Technologies in Vocational Programs at Comprehensive High Schools	22
7.	Implementation of Specific Advanced Technologies in Vocational Programs at Community Colleges	23

CHAPTER I

INTRODUCTION

Background

The impetus for the study comes from a requirement written into Act 1984-107. Section 7(c) reads as follows:

> Upon the termination of this act or July 1, 1987, whichever shall occur sooner, the department shall undertake a survey to update the report "Vocational Education Tool and Equipment Inventory" in order to inform the General Assembly of the impact which this act had on bringing the equipment used in vocational training programs closer to the technology used in industry.

The original study was undertaken because of the legislature's desire to know if vocational education could deliver cost-effective training needed by business and industry. Also, the 1982 Pennsylvania Advisory Council on Vocational Education's recommendations cited the need for a study to establish the adequacy of tools and equipment for delivering vocational education.

The present study was conducted using basically the same instrumentation and methodology as the original survey. There were some modifications in conducting the present study in order to more accurately reflect the impact of the Act 1984-107 funding. These modifications will be described under the appropriate headings in this report.

Statement of the Problem

The problem addressed by this study was to determine the impact of the funds provided under Act 1984-107 to upgrade the tools and equipment used to deliver vocational education in Pennsylvania. Both secondary and postsecondary institutions provided input data for the study.

Questions to be Answered

In pursuing information related to the above problem, it was essential to have secondary and postsecondary personnel respond to items relating to the vocational tools and equipment at their respective institutions. Therefore, the various aspects of tools and equipment utilization at these institutions provided the basis for the formulation of the following questions:

1. Did the nature and extent of comprehensive planning for obtaining the tools and equipment used in vocational programs change with the infusion of Act 1984-107 funds?

2. Did selected aspects of vocational education tools and equipment acquisition and utilization change with the allocation of Act 1984-107 funds?

3. Did Act 1984-107 funds stimulate an increase in the infusion of specific technological advancements into vocational education programs?

In the first chapter the researcher developed a background for undertaking the study. The findings in this study should assist the legislature and Department of Education managers in making decisions about the tools and equipment needed to deliver quality vocational education in the Commonwealth.

CHAPTER II

METHODS

Instrumentation

Information was obtained from a multiple-item survey. In order to make comparisons with the 1983 survey the instrumentation for the 1987 update needed to be very similar. Therefore, only slight modifications were made to the original instrument. The modifications consisted of combining certain questions and, in a few instances, increasing the number of response categories for particular items. The survey instrument was finalized in June 1987 (Appendix A).

Sample

The 1983 survey was sent to vocational directors at 72 area vocational-technical schools, 17 community colleges and 12 selected comprehensive high schools. However, the 1987 sample was limited to those institutions which received funds under the distribution procedures established in Act 1984-107. Table 1 provides the institutional configurations for the funds distribution and the survey responses. A complete list of the institutions receiving Act 1984-107 funds is provided in Appendix B.

Survey Procedures

The impact report requirements of Act 1984-107 specified that the survey be conducted after the expiration of the legislation which was June 30, 1987. Therefore, the first survey mailing to recipient institutions was on July 17, 1987. The survey instrument was accompanied by a letter of explanation (Appendix C). The response to the initial mailing, with a return date of August 17, 1987, was only about 20 percent. Numerous reasons were offered for the low return rate, but the timing of the survey seemed to be cited most often; that is, staff and/or records were not accessible because schools were closed for the summer.

A more emphatic plea went out with a second mailing on September 4, 1987 with a deadline of September 21, 1987 (Appendix D). The second mailing increased the response to slightly over 50 percent. Even this latter response rate was not considered acceptable considering the amount of monies that was allocated to the institutions under Act 1984-107.

A decision was made to begin telephone contacts with staff at the non-responding institutions. These contacts began in October and ended on November 6, 1987. The final response rates were reflected in Table 1.

TABLE 1

SAMPLING MATRIX OF AGENCIES PROVIDED
VOCATIONAL EDUCATION TOOLS AND EQUIPMENT
FUNDS THROUGH ACT 1984-107

TYPE OF INSTITUTION	NUMBER OF RECIPIENTS	SURVEY SAMPLE	NUMBER OF RESPONDENTS	RESPONDENTS AS PERCENT OF TOTAL SAMPLE
Area Vocational Schools	71	71	70*	98.6
Comprehensive High Schools	61	61	60*	98.4
Community Colleges	14	14	14	100.0
Total	146	146	144	98.6

* Nonresponding institutions to survey

1. Hazleton Area Vocational-Technical School (Allocated $102,929)
2. Wellsboro Area School District (Allocated $9,996)

Data Analysis

The data resulting from the survey was inputted directly to the Department of Education's computer. The necessary analysis was completed by the Bureau of Information Systems in consultation with the researcher.

Limitation of the Study

The study had a major limitation, in that the data were obtained from local education agency sources. Therefore, the information was only as valid as their estimates of value, age and other requested data about vocational education tools and equipment.

CHAPTER III

RESULTS

The presentation of results from this 1987 survey is somewhat different than the 1983 report. Thus, direct comparisons were somewhat difficult but nevertheless were made where appropriate. One major departure from the 1983 survey was the graphic presentation of some results. The graphic format was utilized to make visual interpretation possible and efficient.

The results were obtained from the summarized responses of local education agency sources to the various items on the survey instrument. In reporting the results, each of the study questions is stated followed by a description and the related data.

Question 1 - Did the nature and extent of comprehensive planning for obtaining the tools and equipment used in vocational programs change with the infusion of Act 1984-107 funds?

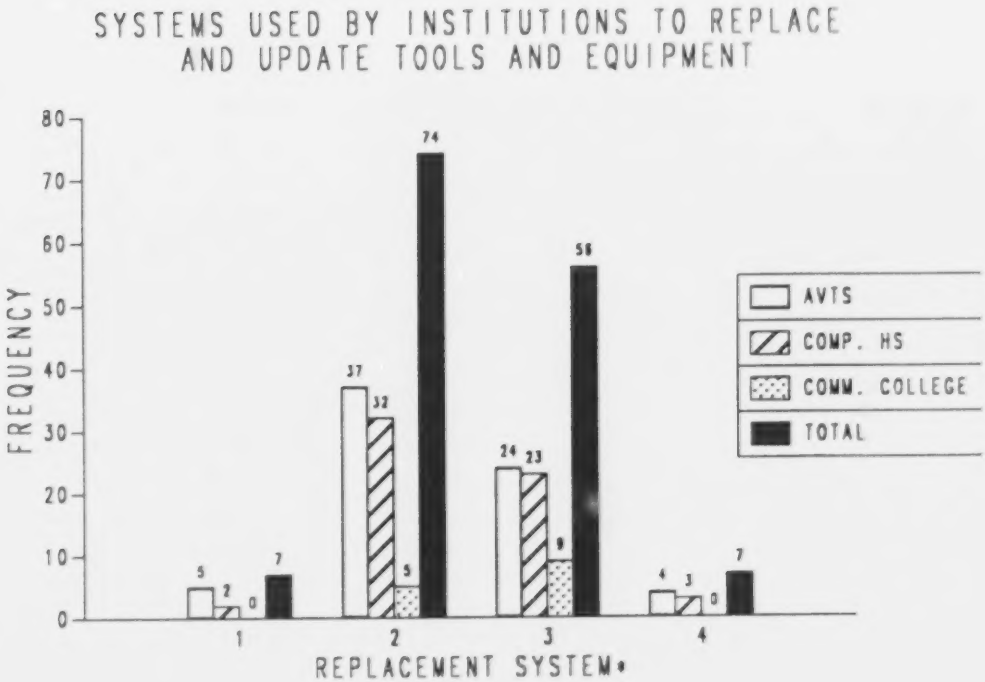
The results in Figure 1 showed that system 2 (as new or replacement equipment is required, proposals are made to the governing board) was the most prevalent procedure for replacing and updating vocational education tools and equipment. These results were consistent with those in the 1983 survey. The system was used by 74 (51.9%) of the institutions in 1987 compared to 60 (47%) in 1983. The second most popular replacement system was number 3 (tools and equipment are prioritized and replacement occurs when funds are available). Fifty-six (38.9%) institutions reported using the system in the 1987 survey compared to 27 (21%) in 1983.

The interinstitutional differences were reflective of the total with all three types of institutions reporting extensive use of systems 2 and 3. The area vocational-technical schools and the comprehensive high schools also reported using systems 1 and 4 but to a much lesser degree. The community colleges did not utilize either of the two latter systems.

Figure 2 depicts how institutions secure funds to pay the cost of replacing vocational education tools and equipment. As in the 1983 survey, the primary source of funds was number 1 (line item in annual operating budget) with 94 (65.3%) institutions reporting its use. Only two (1.4%) of the community colleges indicated use of the annual operating budget; however, this group of institutions was unique in the way they secure funds for conducting educational programs.

The second most frequently used funding source was number 3 (Act 1984-107 funds) with 24 (16.7%) institutions reporting the use of these funds. As with the most frequent category above, only two (1.4%) of the community colleges cited Act 1984-107 as a primary source. Since these funds were not available in 1983, no direct comparison was possible. However, the second most cited funding source in the 1983 survey was federal funds with 53 (29%) of the institutions reporting their use.

FIGURE 1

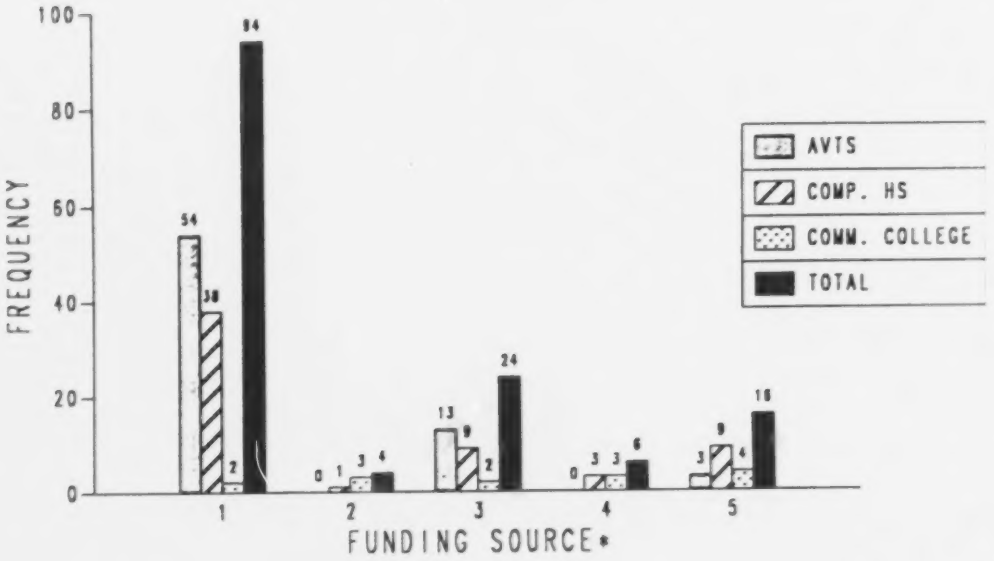


*REPLACEMENT SYSTEMS

1. Tools and equipment are depreciated and replacement occurs on an established schedule
2. As new or replacement equipment is required proposals are made to the governing board
3. Tools and equipment are prioritized and replacement occurs when funds are available
4. Other

FIGURE 2

FUNDING SOURCES USED BY INSTITUTIONS TO PAY THE COST OF REPLACING TOOLS AND EQUIPMENT



*FUNDING SOURCES

1. Line item in annual operating budget
2. Special tools and equipment fund
3. Act 107 funds
4. Other state funds
5. Federal funds

The above results were verified in Figure 3 which showed the mean percentage of tools and equipment cost paid from various sources. Figure 3 validated the extensive use of local funds to pay for most tools and equipment used to provide vocational education. For area vocational-technical schools and comprehensive high schools over 50 percent of the cost of the tools and equipment were paid with local funds; whereas, community colleges only derived 10 percent of their funds from local sources. Compared to the 1983 results (72, 61, 31 percent, respectively) the current figures were somewhat lower.

As with Figure 2, the second most cited funding source was the Act 1984-107 funds. It appeared that over one-third (34%) of the tools and equipment in the community colleges were bought with these funds, despite the fact that only two of these institutions reported Act 1984-107 funds as the primary funding source.

Figure 3 showed that comprehensive high schools reported a mean of 16 percent of their vocational education tools and equipment being acquired with Act 1984-107 funds. This figure was five percent below the 21 percent reported by this group for federal funds. The 16 percent was also two percent below the 18 percent reported for other state funds in 1983. However, the 16 percent of Act 1984-107 funds combined with the six percent of other state funds in the current survey provided a total of 22 percent in 1987 results.

The area vocational-technical schools reported 27 percent of their vocational education tools and equipment were acquired through Act 1984-107 funds. In the 1983 survey state funds accounted for only 18 percent of the costs, while one-third (33%) were via federal funds. Comprehensive high schools and community colleges each reported 21 percent of their vocational education tools and equipment costs were paid with federal funds. Comparatively, in 1983 these two types of institutions reported 33 and 38 percent federal support, respectively.

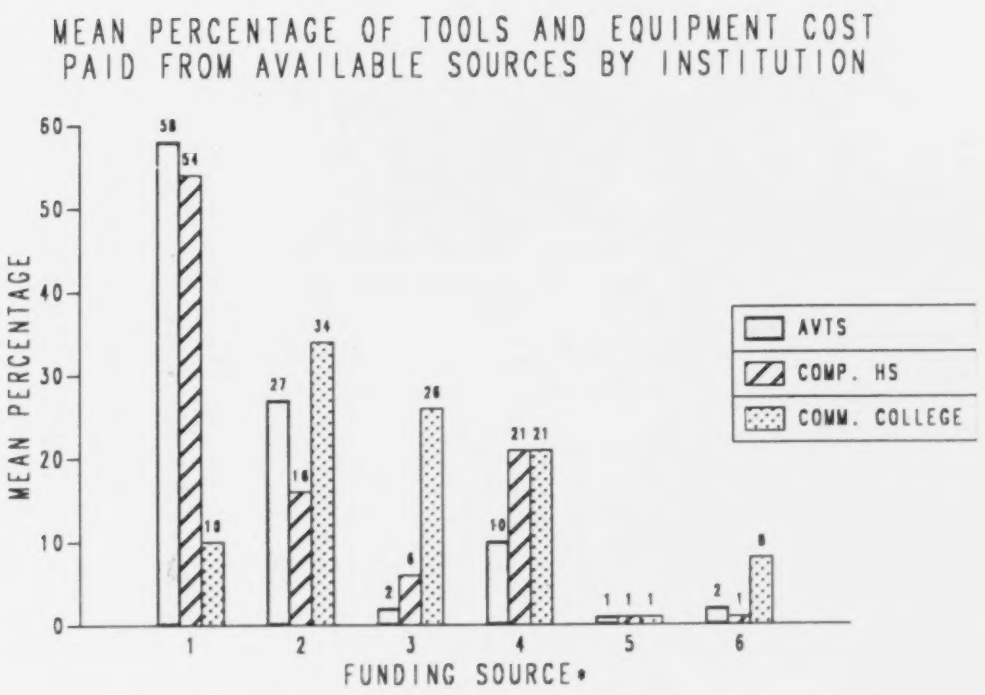
The information in Figure 4 provided some closely related data to the above; that is, the percentage of vocational education tools and equipment needs presently being met at the different types of institutions. Overall, most respondents reported at least 71 percent of their needs being met. An institutional examination of Figure 4 indicated comprehensive high schools and area vocational-technical schools clustered most frequently in the upper limits. A comparison with 1983 was not possible because the question was not asked in the earlier survey.

Question 2 - Did selected aspects of vocational education tools and equipment acquisition and utilization change with the allocation of Act 1984-107 funds?

Tables 2, 3, 4 and 5 provided the information relative to answering question 2. The tables contained summary data relative to eight aspects of vocational education tools and equipment. The data were also categorized by institution and program.

The first fiscal characteristic was the "Estimated Current Total Value of Vocational-Technical Education Tools and Equipment." In the present survey the overall value was estimated at $201,082,000 (Table 5) compared to the $132,881,000 reported in 1983. This represents an increased value of $68,201,000, or 51 percent, over the last three years.

FIGURE 3



*FUNDING SOURCES

1. Local school districts
2. Act 107 funds
3. Other state funds
4. Federal funds
5. Private sector contributions
6. Other

FIGURE 4

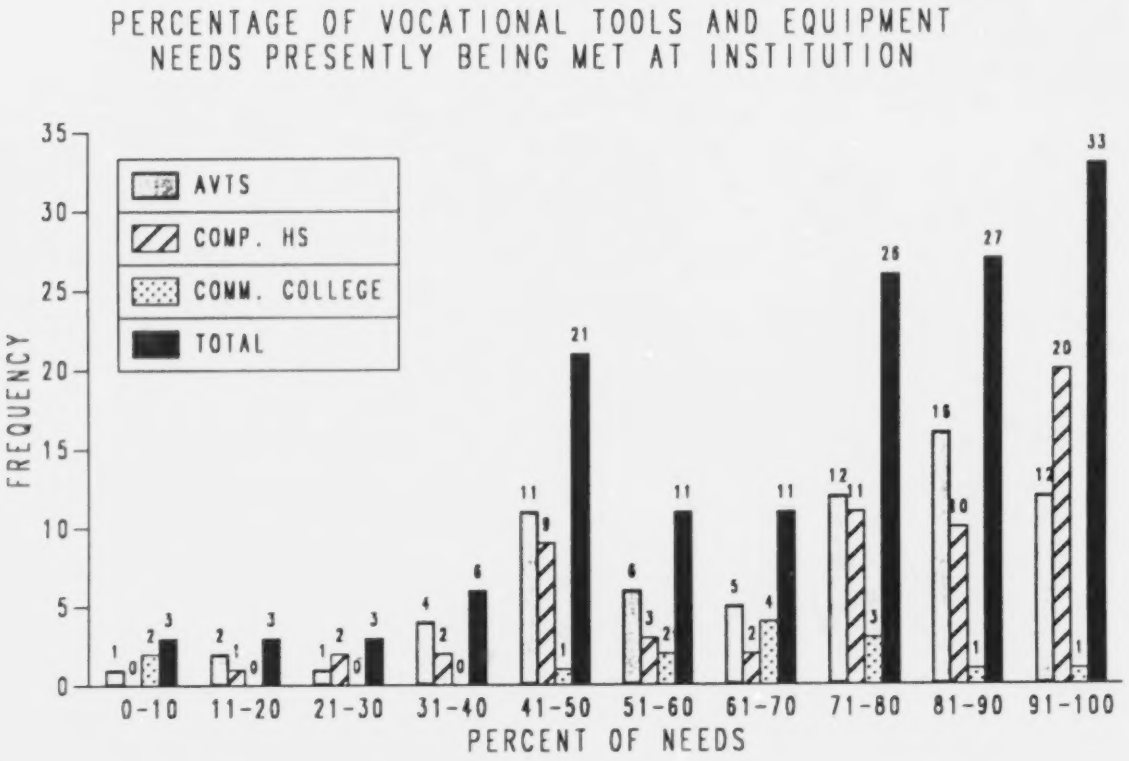

PERCENTAGE OF VOCATIONAL TOOLS AND EQUIPMENT NEEDS PRESENTLY BEING MET AT INSTITUTION
AVTS
COMP. HS
COMM. COLLEGE
TOTAL
FREQUENCY
0
5
10
15
20
25
30
35
0-10
11-20
21-30
31-40
41-50
51-60
61-70
71-80
81-90
91-100
PERCENT OF NEEDS

TABLE 2

SELECTED FISCAL CHARACTERISTICS OF TOOLS AND EQUIPMENT NEEDED TO PROVIDE VOCATIONAL-TECHNICAL EDUCATION AT AVTSs BY PROGRAM AREA*

FISCAL CHARACTERISTIC	AGRICULTURE	BUSINESS	MARKETING AND DISTRIBUTIVE EDUCATION	HEALTH	HOME ECONOMICS	TRADE AND INDUSTRIAL EDUCATION	TECHNICAL EDUCATION	TOTAL
1. Estimated current total value	$ 2,719 ($ 3,545)	$ 4,971 ($ 5,428)	$ 1,574 ($ 1,566)	$ 3,369 ($ 2,593)	$ 7,860 ($ 5,816)	$92,676 ($80,622)	$18,213 ($14,824)	$131,382 ($114,394)
2. Percentage over 10 years old	29%	6%	22%	39%	39%	52%	26%	NA
	(Dollar values were requested in the 1983 survey instead of percentages)							
3. Percentage obsolete	7%	4%	7%	14%	10%	20%	10%	NA
	(Dollar values were requested in the 1983 survey instead of percentages)							
4. Dollar value of annual budget	$ 122 ($ 78)	$ 245 ($ 310)	$ 72 ($ 53)	$ 1,145 ($ 79)	$ 169 ($ 1,330)	$ 2,453 ($ 1,606)	$ 599 ($ 521)	$ 4,805 ($ 3,977)
5. Cost to bring to business and industry standard	$ 933 ($ 1,477)	$ 1,303 ($ 3,185)	$ 387 ($ 590)	$ 1,570 ($ 702)	$ 1,182 ($ 1,377)	$20,434 ($24,140)	$ 5,031 ($ 6,033)	$ 30,840 ($ 37,504)
6. Dollar value of private sector contributions	$ 14 ($ 1,729)	$ 19 ($ 28)	$ 26 ($ 17)	$ 82 ($ 15)	$ 5 ($ 7)	$ 1,185 ($ 394)	$ 745 ($ 61)	$ 2,076 ($ 2,251)
7. Dollar value of advanced technology equipment	$ 249	$ 1,441	$ 174	$ 375	$ 235	$ 9,952	$ 4,637	$ 17,063 ($ 13,262)
	(No breakdown by program in 1983 survey)							
8. Dollar value to start advanced technology programs	$ 131	$ 999	$ 167	$ 800	$ 145	$ 9,180	$ 5,270	$ 16,692 ($ 8,325)
	(No breakdown by program in 1983 survey)							

*Dollar amounts are rounded to the nearest thousands.
( ) Represent values reported in the 1983 survey.

TABLE 3

SELECTED FISCAL CHARACTERISTICS OF TOOLS AND EQUIPMENT NEEDED TO PROVIDE VOCATIONAL-TECHNICAL EDUCATION AT HIGH SCHOOLS BY PROGRAM AREA*

FISCAL CHARACTERISTIC	AGRICULTURE	BUSINESS	MARKETING AND DISTRIBUTIVE EDUCATION	HEALTH	HOME ECONOMICS	TRADE AND INDUSTRIAL EDUCATION	TECHNICAL EDUCATION	TOTAL
1. Estimated current total value	$ 1,204 ($ 182)	$ 5,537 ($ 1,895)	$ 298 ($ 112)	$ 1,151 ($ 63)	$ 1,470 ($ 1,384)	$ 8,319 ($ 3,479)	$ 1,655 ($ 771)	$ 19,634 ($ 7,886)
2. Percentage over 10 years old	26%	23%	9%	4%	28%	18%	5%	NA
	(Dollar values were requested in the 1983 survey instead of percentages)							
3. Percentage obsolete	7%	16%	1%	1%	8%	9%	4%	NA
	(Dollar values were requested in the 1983 survey instead of percentages)							
4. Dollar value of annual budget	$ 106 ($ 12)	$ 711 ($ 124)	$ 27 ($ 8)	$ 58 ($ 5)	$ 204 ($ 102)	$ 1,322 ($ 175)	$ 137 ($ 8)	$ 2,565 ($ 434)
5. Cost to bring to business and industry standard	$ 799 ($ 39)	$ 6,379 ($ 375)	$ 505 ($ 36)	$ 462 ($ 16)	$ 1,047 ($ 85)	$ 5,174 ($ 1,763)	$ 1,382 ($ 145)	$ 15,748 ($ 2,459)
6. Dollar value of private sector contributions	$ 3 ($ 2)	$ 95 ($ 3)	$ 0 ($ 1)	$ 33 ($ 1)	$ 1 ($ 5)	$ 379 ($ 21)	$ 28 ($ 3)	$ 539 ($ 36)
7. Dollar value of advanced technology equipment	$ 402	$ 5,325	$ 430	$ 88	$ 785	$ 1,638	$ 1,151	$ 9,819 ($ 265)
	(No breakdown by program in 1983 survey)							
8. Dollar value to start advanced technology programs	$ 447	$ 6,040	$ 301	$ 277	$ 882	$ 2,207	$ 1,304	$ 11,458 ($ 10,596)
	(No breakdown by program in 1983 survey)							

*Dollar amounts are rounded to the nearest thousands.
( ) Represent values reported in the 1983 survey.

TABLE 4

SELECTED FISCAL CHARACTERISTICS OF TOOLS AND EQUIPMENT NEEDED TO PROVIDE VOCATIONAL-TECHNICAL EDUCATION AT COMM. COLLEGES BY PROGRAM AREA*

FISCAL CHARACTERISTIC	AGRICULTURE	BUSINESS	MARKETING AND DISTRIBUTIVE EDUCATION	HEALTH	HOME ECONOMICS	TRADE AND INDUSTRIAL EDUCATION	TECHNICAL EDUCATION	TOTAL
1. Estimated current total value	$ 1,436 ($ 2)	$ 8,732 ($ 3,384)	$ 165 ($ 10)	$ 6,844 ($ 1,303)	$ 106 ($ 111)	$ 9,559 ($ 718)	$23,224 ($ 5,073)	$ 50,066 ($ 10,601)
2. Percentage over 10 years old	1%	13%	0%	22%	6%	12%	11%	NA
	(Dollar values were requested in the 1983 survey instead of percentages)							
3. Percentage obsolete	1%	17%	5%	26%	1%	22%	19%	NA
	(Dollar values were requested in the 1983 survey instead of percentages)							
4. Dollar value of annual budget	$ 6 ($ 14)	$ 324 ($ 102)	$ 0 ($ 0)	$ 527 ($ 34)	$ 20 ($ 40)	$ 246 ($ 5)	$ 1,066 ($ 96)	$ 2,189 ($ 291)
5. Cost to bring to business and industry standard	$ 450 ($ 5)	$ 2,744 ($ 2,158)	$ 30 ($ 10)	$ 3,993 ($ 715)	$ 45 ($ 213)	$ 8,001 ($ 308)	$ 8,236 ($ 2,054)	$ 23,499 ($ 5,463)
6. Dollar value of private sector contributions	$ 0 ($ 0)	$ 45 ($ 0)	$ 2 ($ 0)	$ 61 ($ 0)	$ 5 ($ 0)	$ 718 ($ 3)	$ 720 ($ 30)	$ 1,551 ($ 33)
7. Dollar value of advanced technology equipment	$ 20	$ 835	$ 5	$ 2,039	$ 0	$ 4,151	$ 8,414	$ 15,464 ($ 2,401)
	(No breakdown by program in 1983 survey)							
8. Dollar value to start advanced technology programs	$ 0	$ 580	$ 30	$ 1,735	$ 100	$ 4,770	$ 3,465	$ 10,680 ($ 2,077)
	(No breakdown by program in 1983 survey)							

*Dollar amounts are rounded to the nearest thousands.
( ) Represent values reported in the 1983 survey.

TABLE 5

SELECTED FISCAL CHARACTERISTICS OF TOOLS AND EQUIPMENT NEEDED TO PROVIDE VOCATIONAL-TECHNICAL EDUCATION IN PENNSYLVANIA BY PROGRAM AREA*

FISCAL CHARACTERISTIC	AGRICULTURE	BUSINESS	MARKETING AND DISTRIBUTIVE EDUCATION	HEALTH	HOME ECONOMICS	TRADE AND INDUSTRIAL EDUCATION	TECHNICAL EDUCATION	TOTAL
1. Estimated current total value	$ 5,359 ($ 3,729)	$19,240 ($10,707)	$ 2,037 ($ 1,688)	$11,364 ($ 3,959)	$ 9,436 ($ 7,311)	$110,554 ($ 84,819)	$43,092 ($20,668)	$201,082 ($132,881)
2. Percentage over 10 years old	25%	14%	15%	23%	31%	34%	16%	NA
	(Dollar values were requested in the 1983 survey instead of percentages)							
3. Percentage obsolete	7%	10%	5%	10%	8%	16%	8%	NA
	(Dollar values were requested in the 1983 survey instead of percentages)							
4. Dollar value of annual budget	$ 234 ($ 104)	$ 1,280 ($ 536)	$ 99 ($ 61)	$ 1,730 ($ 118)	$ 393 ($ 1,472)	$ 4,021 ($ 1,786)	$ 1,802 ($ 625)	$ 9,559 ($ 4,702)
5. Cost to bring to business and industry standard	$ 2,182 ($ 1,521)	$10,426 ($ 5,718)	$ 922 ($ 636)	$ 6,025 ($ 1,433)	$ 2,274 ($ 1,675)	$ 33,609 ($ 26,211)	$14,649 ($ 8,232)	$ 70,087 ($ 45,426)
6. Dollar value of private sector contributions	$ 17 ($ 1,731)	$ 159 ($ 31)	$ 28 ($ 18)	$ 176 ($ 16)	$ 11 ($ 12)	$ 2,282 ($ 418)	$ 1,493 ($ 94)	$ 4,166 ($ 2,320)
7. Dollar value of advanced technology equipment	$ 671	$ 7,601	$ 609	$ 2,502	$ 1,020	$ 15,741	$14,202	$ 42,346 ($ 15,928)
	(No breakdown by program in 1983 survey)							
8. Dollar value to start advanced technology programs	$ 578	$ 7,619	$ 498	$ 2,812	$ 1,127	$ 16,157	$10,039	$ 38,830 ($ 10,596)
	(No breakdown by program in 1983 survey)							

*Dollar amounts are rounded to the nearest thousands.
( ) Represent values reported in the 1983 survey.

Institutionally, the area vocational-technical schools reported the largest valuation at $131,382,000 (Table 2) followed by the community colleges and comprehensive high schools at $50,066,000 (Table 4) and $19,634,000 (Table 3), respectively. Compared to the 1983 survey the community colleges increased by $39,465,000, while the area vocational-technical schools and comprehensive high schools increased by $16,988,000 and $11,748,000, respectively.

Programmatically, all the program areas reported increases in overall tool and equipment values (Table 5) with two exceptions. Both exceptions occurred at the area vocational-technical schools (Table 2) in Agriculture (-$826,000) and Business (-$457,000). The largest increases occurred in the program areas of Trade and Industrial Education ($25,735,000) and Technical Education ($22,424,000).

The second fiscal characteristic dealt with the "Percentage of Tools and Equipment Over 10 Years Old." There is an inverse relationship between age and value. In the 1983 survey, dollar values were requested rather than percentages; thus direct comparisons were difficult.

Institutionally, the area vocational-technical schools reported the highest percentages of tools and equipment over 10 years old (Table 2). The percentages ranged from a low of six percent in the Business programs to a high of 52 percent in Trade and Industrial Education.

The comprehensive high schools showed the second highest percentages of older tools and equipment (Table 3). The range here was from a low of four percent in Health to a high of 28 percent in Home Economics.

Community colleges reported somewhat lower percentages (Table 4) with a low of zero in Marketing and Distributive Education to a high of 22 percent in Health.

Programmatically, the Trade and Industrial Education area showed the highest percentage of older tools and equipment at 34 percent (Table 5) followed by Home Economics, 31 percent; Agriculture, 25 percent; and Health, 23 percent. The other three program areas indicated percentages of less than 20 percent each. The results were similar to the 1983 survey where 71.2 percent of the overall dollar value of older tools and equipment was in the Trade and Industrial Education area.

The third fiscal characteristic dealt with the "Percentage of Obsolete Tools and Equipment." As with the second characteristic in the 1983 survey, dollar values were requested rather than percentages, thus direct comparisons were difficult.

Institutionally, the community colleges reported the highest percentages of obsolete tools and equipment. The percentages ranged from a high of 26 percent in Trade and Industrial Education to lows of one percent in Agriculture and Home Economics (Table 4). These percentages were not very different from the results in 1983 where the value of the obsolete tools and equipment was highest in Trade and Industrial Education and lowest in Home Economics, Marketing and Distributive Education and Agriculture. The data (Tables 2 and 3) for the area vocational-technical schools and comprehensive high schools were generally

lower in this characteristic. The comprehensive high schools indicated a 16 percent figure for the Business programs, while the rest of their programs were single-digit percentages. The area vocational-technical schools showed single-digit percentages in Agriculture, Business and Marketing and Distributive Education. The other program areas were in the teens except for Trade and Industrial Education at 20 percent. These figures depart somewhat from those in 1983 where the community colleges had the lowest dollar value of obsolete tools and equipment and the other two types of institutions were the highest. Program areas within the institutions in 1983 were quite similar in dollar value to the percentage figures in 1987.

Programmatically, the 1987 data (Table 5) showed relatively low percentages of obsolete tools and equipment. The highest percentage was in Trade and Industrial Education at 16 percent. The only other two-digit percentages were in Business and Health with 10 percent each. The results were similar to 1983 where the highest monetary value was in Trade and Industrial Education followed by Technical Education and Business.

The fourth fiscal characteristic was "The Dollar Value of the Institution's Annual Tool and Equipment Budget." Institutionally, the community colleges showed the greatest increase in annual budgets moving from $291,000 in 1983 to $2,189,000 in 1987 (Table 4). Most of the increase occurred in the Technical Education and Health program areas with $970,000 and $493,000, respectively. Agriculture and Home Economics both received less than their 1983 amounts.

The comprehensive high schools ranked second in increased annual expenditures for vocational education tools and equipment. The high schools increased their annual budgets from $434,000 in 1983 to $2,565,000 in 1987 (Table 3). All program areas (within the high schools) showed increases over the 1983 levels with Trade and Industrial Education increasing by $1,147,000 and Business by $587,000. While the area vocational-technical schools indicated the smallest budget increase over 1983 levels, their total annual expenditure was the highest of all institutions at $4,805,000 (Table 2). The figure was an increase of $828,000 over 1983. Interestingly, the data showed decreases in Business and Home Economics. These were the same areas in which the high schools reported increases.

Programmatically, Trade and Industrial Education, Technical Education, Health and Business showed the largest annual tool and equipment budgets (Table 5) at $4,021,000, $1,802,000, $1,730,000 and $1,280,000, respectively. The other three program areas were substantially under $1 million each. In the earlier survey Trade and Industrial Education (Table 5) showed the largest annual budget. Home Economics was second and was the only other program area with an annual tool and equipment expenditure in excess of $1 million. Technical Education programs were only at $625,000 compared to $1,802,000 in 1987. The other program areas spent substantially less.

The fifth fiscal characteristic was the "Cost to Bring to Business and Industry Standard." Institutionally, the area vocational-technical schools reported the largest amounts on this characteristic (Table 2). The 1987 total was $30,840,000 compared to $37,504,000 in 1983. The two highest program areas in the area vocational-technical schools were Trade and Industrial Education and Technical Education at $20,434 and $5,031,000, respectively. Health was

third highest at $1,570,000 which was more than double the 1983 estimate of $702,000. Three other areas (Home Economics, Business and Agriculture) were clustered around $1 million each, while Marketing and Distributive Education was at $387,000.

Community colleges reported the second highest cost of updating at $23,499,000 or more than four times the estimated 1983 figure (Table 4). As with the area vocational-technical schools, the two highest areas were Trade and Industrial Education and Technical Education at $8,001,000 and $8,236,000, respectively. Both of these estimates were considerably higher than in 1983. The Health area was third highest at $3,993,000 followed by Business at $2,744,000. The three remaining areas were much lower with Home Economics reporting less needed now than in 1983.

High schools ranked third on the above characteristic (Table 3). The total was $15,748,000 compared to $2,459,000 in 1983. While the area vocational-technical schools and community colleges indicated highest costs in the Trade and Industrial Education and Technical Education areas, the high schools reported higher costs in Business. The 1987 figure for the latter area was $6,379,000 compared to $375,000 in 1983. Trade and Industrial Education was second at $5,174,000. The only other two program areas to exceed $1 million each in 1987 were Technical Education ($1,382,000) and Home Economics ($1,047,000). These figures represent significant increases over the 1983 figures of $145,000 and $85,000, respectively. All the other areas were well below the $1 million annual figure.

Programmatically, the overall total (Table 5) of bringing equipment to industry standards was $70,087,000 in 1987 and $45,426,000 in 1983. The Trade and Industrial Education area accounted for nearly one-half ($33,609,000) of the total in 1987 and nearly 58 percent in 1983. Technical Education was second at $14,649,000, while Business was third with $10,426,000.

The sixth fiscal characteristic was the "Dollar Value of Private Sector Contributions." The area vocational-technical schools were the only institutions to achieve $1 million of support in one program area. The area was Trade and Industrial Education at $1,185,000 in the 1987 survey compared to $394,000 in 1983 (Table 3). The Technical Education area reportedly received $745,000 in 1987 and $61,000 in 1983. None of the other program areas approach a six-digit contribution. The total for all programs in the area vocational-technical schools was $2,076,000.

The high schools and community colleges were less fortunate in the amount of money received from the private sector. In total, the high schools received $539,000 (Table 3) and the community colleges $1,551,000 (Table 4).

Programmatically, the grand total of private sector contributions in the 1987 survey was $4,166,000 or almost double the 1983 figure of $2,320,000 (Table 5). As with most of the other characteristics, Trade and Industrial Education and Technical Education received the most private sector contributions at $2,282,000 and $1,493,000, respectively, in the 1987 survey. In the 1983 survey Agriculture at $1,731,000 led all program areas but in 1987 reported only $17,000. However, all the other program areas reported higher contributions than in 1983.

The seventh fiscal characteristic was the "Dollar Value of Advanced Technology Equipment." Institutionally, the area vocational-technical schools showed a total of $17,063,000 in 1987 compared to $13,262,000 in 1983 (Table 2). Trade and Industrial Education at $9,952,000 and Technical Education at $4,637,000 were the two highest program areas in these schools. The only other program area that reported over $1 million was Business.

Community colleges reported a total of $15,464,000 for the characteristic (Table 4). As with the area vocational-technical schools, Trade and Industrial Education ($4,151,000) and Technical Education ($8,414,000) were the two highest program areas. The Health area in the community colleges reported $2,039,000 in 1987, while Business was at $835,000. The three remaining program areas indicated less than $20,000 each in advanced technology equipment.

High schools were lowest on this characteristic with a total of $9,819,000. The highest amount reported was in the Business program with $5,325,000. Trade and Industrial Education and Technical Education followed somewhat distantly at $1,638,000 and $1,151,000, respectively. Home Economics was at $785,000; Marketing and Distributive Education, $430,000; Agriculture, $402,000; and Health $88,000.

Programmatically, a total of $42,346,000 was reported as the value of advanced technology tools and equipment (Table 5). The majority of the value was in the Trade and Industrial Education and Technical Education program areas which reported $15,741,000 and $14,202,000, respectively, in 1987. Business had $7,601,000, Health, $2,502,000 and Home Economics, $1,020,000.

The final characteristic was the "Dollar Value to Start Advanced Technology Programs." Institutionally, the area vocational-technical schools reported needing a total of $16,692,000 (Table 2) in 1987 compared to $8,325,000 in the 1983 survey. As with the seventh characteristic, Trade and Industrial Education ($9,180,000) and Technical Education ($5,270,000) indicated needing the greatest amount to start advanced technology programs. The Business program area was third at $999,000 followed by Health ($800,000), Marketing and Distributive Education ($167,000), Home Economics ($145,000) and Agriculture ($131,000).

The high schools reported needing a total of $11,458,000 in 1987 compared to $10,596,000 in 1983. The Business program area indicated the highest need at $6,040,000 followed by Trade and Industrial Education ($1,638,000) and Technical Education ($1,151,000). Home Economics ($882,000) was fourth followed by Agriculture ($447,000), Marketing and Distributive Education ($301,000) and Health ($277,000).

Community colleges at a total of $10,680,000 in 1987 were just slightly below high schools on the characteristic. In 1983 community colleges reported needing $2,077,000 to start advanced technology programs. Trade and Industrial Education ($4,770,000) and Technical Education ($3,465,000) were the program areas reporting the greatest need.

Programmatically, a reported total of $38,830,000 was needed to start advanced technology programs in 1987 compared to $10,596,000 in 1983. Trade and Industrial Education led all program areas with a dollar value of $16,157,000 or nearly half of the total. Technical Education was second at $10,039,000

which was just slightly under the overall total in 1983. Three other program areas reported values in excess of $1 million: Business ($7,619,000), Health ($2,812,000) and Home Economics ($1,127,000).

Question 3 - Did Act 1984-107 funds stimulate an increase in the infusion of specific technological advancements into vocational education programs?

Data relating to this question are presented in Figures 5, 6 and 7. The figures graphically display the frequency of occurrence of the various advanced technologies implemented in the three types of institutions. These advanced technologies are discussed below relative to their degree of implementation in the different institutions.

The implementation data for the area vocational-technical schools were reported in Figure 5. For "new programs" planned, the 1987 results were similar to those reported in 1983; that is, robotics, word processing, CAD/CAM and other were the technologies cited most often. As in 1983, no area vocational-technical schools were planning to start programs in laser technologies or fiber optics.

The "new program developed" data indicated three technologies increased over 1983. The three were robotics, microprocessors and electromechanic. While these technologies increased, the increase was minimal with only a few additional schools reporting the development of these programs.

In terms of usage, there were four response categories; namely, extensive use, some use, slight use and not using. The technologies that showed "extensive use" increases over 1983 were robotics, microprocessors, word processing, laser technology, CAD/CAM, telecommunications and other. The electromechanical and medical/scientific devices technologies were used less than in 1983.

The "some use" category showed mixed results compared to 1983. Robotics, laser technology, fiber optics, biotechnology, medical/scientific devices and other increased, while energy savings, microprocessors, word processing and electromechanical were the same. Specialized materials and telecommunications were lower.

The "slight use" category results showed robotics, laser technology and fiber optics up. Energy savings, microprocessors, word processing, electromechanical, biotechnology, specialized materials, telecommunications and medical/scientific devices were the same as in 1983, while CAD/CAM was down.

The "not using" category showed the most change from the prior survey. The technologies of robotics, microprocessors, word processing, laser technology, fiber optics, CAD/CAM and electromechanical were all lower. These technologies were being used more. Energy savings and biotechnology remained about the same, while specialized materials, telecommunications and medical/scientific were being implemented less.

The comprehensive high school implementation data were reported in Table 5. The "new program planned" results showed implementation was about evenly divided between increases or the same as 1983. Increases were in word processing, laser technology, CAD/CAM, electomechanical and telecommunications. The technologies remaining the same were energy savings, robotics, microprocessors, fiber optics, biotechnology, medical/scientific devices and other.

FIGURE 5

IMPLEMENTATION OF SPECIFIC ADVANCED TECHNOLOGIES IN VOCATIONAL PROGRAMS AT AREA VOCATIONAL-TECHNICAL SCHOOLS

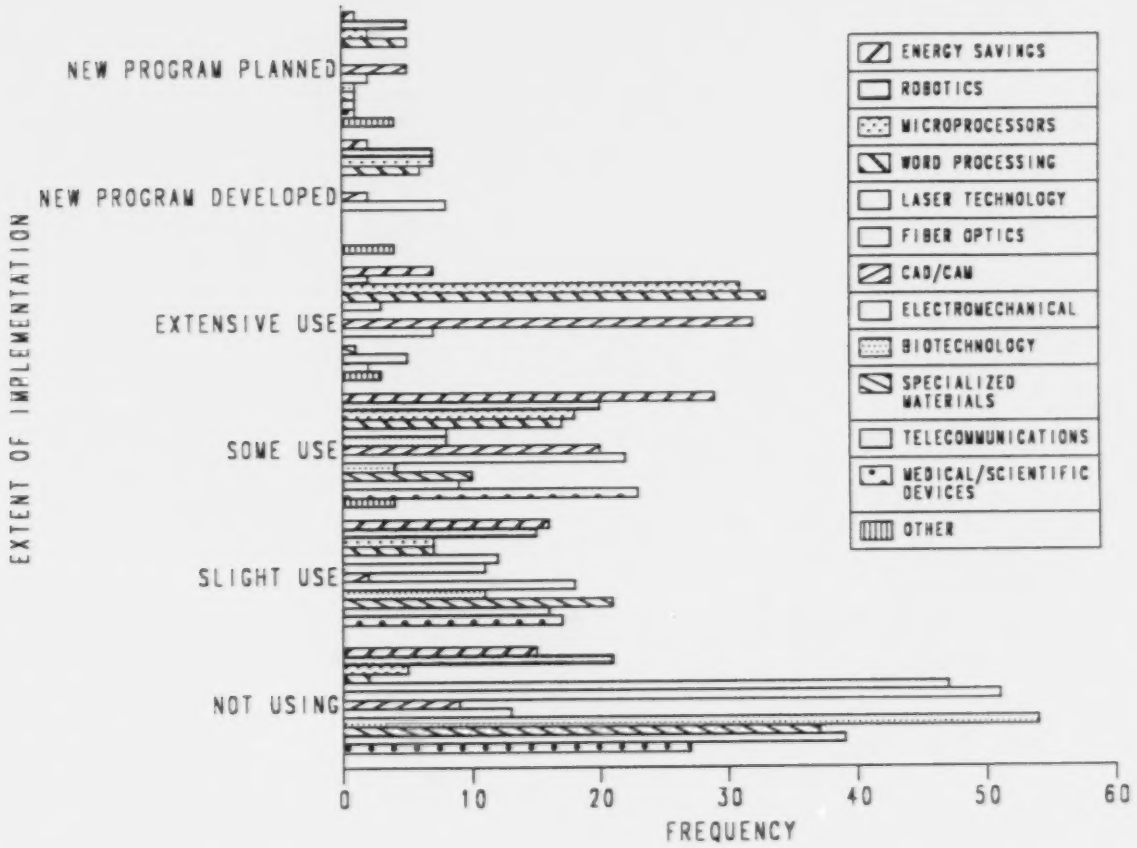


FIGURE 6

IMPLEMENTATION OF SPECIFIC ADVANCED TECHNOLOGIES IN VOCATIONAL PROGRAMS AT COMPREHENSIVE HIGH SCHOOLS

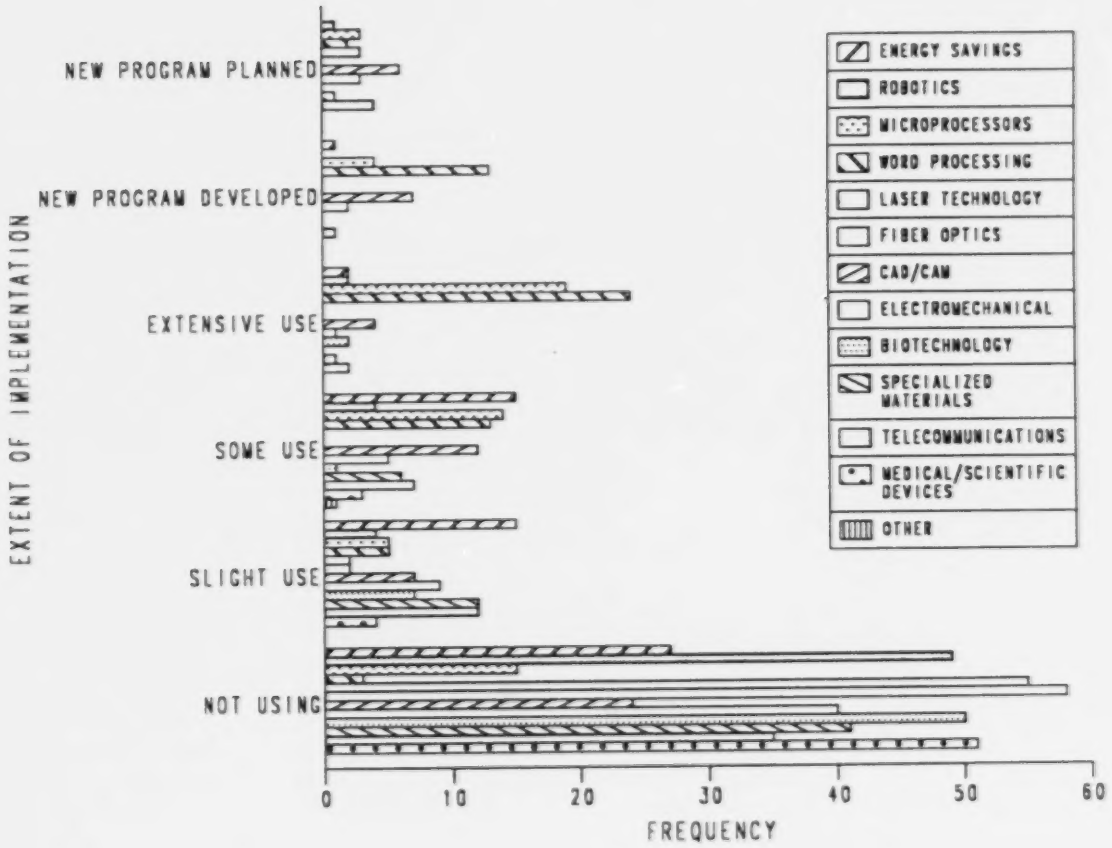
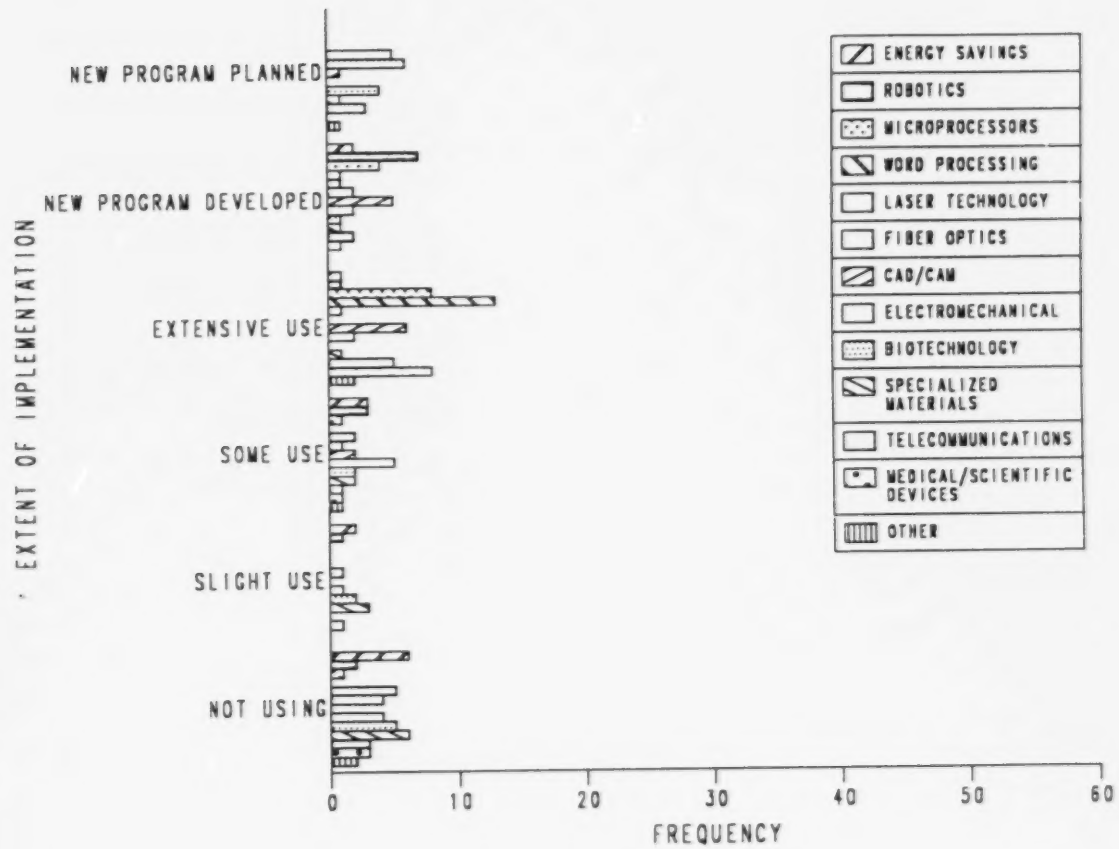


FIGURE 7

IMPLEMENTATION OF SPECIFIC ADVANCED TECHNOLOGIES IN VOCATIONAL PROGRAMS AT COMMUNITY COLLEGES



The "new program developed" category showed results similar to the above. Energy savings, microprocessors, word processing, CAD/CAM, electromechanical and telecommunications increased, while robotics, laser technology, fiber optics, biotechnology, specialized materials, medical/scientific devices and other were lower.

In terms of usage, the results were not much different than the above categories. The "extensive use" response indicated large increases in microprocessors and word processing with smaller gains in laser technology and CAD/CAM. All the other technologies--fiber optics, electromechanical, biotechnology, specialized materials, telecommunications, medical/scientific devices and other--were about the same as reported in 1983.

The "some use" response indicated increases in energy savings, robotics, microprocessors, word processing, CAD/CAM, electromechanical, biotechnology, specialized materials and telecommunications. Laser technology, fiber optics, medical/scientific devices and other were about equal to the 1983 results.

The "slight use" response saw all technologies on the increase except CAD/CAM which stayed the same as in the previous survey.

The "not using" response showed increases over the previous survey except for word processing which remained the same. Increases in this response category indicated that fewer comprehensive high schools were implementing the advanced technologies.

Ascertaining the magnitude of advanced technology implementation in the community colleges was more difficult than with the aforementioned institutions. The difficulty resulted from the much smaller number of community colleges across the state. The community college data were reported in Figure 7.

The "new program planned" responses showed that increases occurred in laser technology, fiber optics, CAD/CAM, biotechnology, specialized materials and telecommunications. All the other advanced technologies remained about the same as reported in the 1983 survey.

The "new program developed" responses showed increases in robotics, microprocessors, word processing, laser technology, fiber optics, CAD/CAM, electromechanical, specialized materials, telecommunications and other. All the other advanced technologies remained about the same as reported in the 1983 survey.

In terms of usage, similar results were reported. In the "extensive use" category, robotics, word processing, laser technology, CAD/CAM, telecommunications, medical/scientific devices and other showed increases. Energy savings, microprocessors, fiber optics, biotechnology and specialized materials remained the same. Electromechanical was the only technology that showed a decrease.

In the "some use" response category, laser technology, CAD/CAM and biotechnology increased, while energy savings, robotics, fiber optics, electromechanical and other remained the same. The technologies that decreased were microprocessors, word processing, specialized materials, telecommunications and medical/scientific devices.

The "slight use" response category showed increases in biotechnology, specialized materials and medical/scientific devices, while energy savings, robotics, fiber optics, electromechanical and other remained the same. Microprocessors, word processing, laser technology and telecommunications showed decreases.

The "not using" response category was mixed in terms of comparison with 1983. Energy savings, electromechanical, biotechnology and other showed increases. Therefore, there were less of these technologies being used than in 1983. Robotics, laser technology, fiber optics and CAD/CAM responses declined in the category. This really meant that more of these programs were being implemented than in 1983. Finally, microprocessors, word processing, specialized materials, telecommunications and medical/scientific devices were at about the same level of implementation.

The results relative to the aforementioned study questions were occasionally contradictory, especially in the advanced technology area. However, the results did provide some definitive information to ascertain the impact of Act 1984-107.

CHAPTER IV

DISCUSSION AND CONCLUSIONS

As noted in the results, some data were contradictory. However, the information should give the legislature and other decisionmakers an indication of the relative impact of Act 1984-107. In this chapter each of the study questions will be discussed based on the 1987 survey data as they relate to the 1983 results.

Several general comments need to precede a discussion of the study results. First, Act 1984-107 was written so as to provide the community colleges with 45 percent of the available funds, while area vocational-technical schools and comprehensive high schools, combined, received 55 percent. This latter group was much larger in number and a given institution usually received, based on a distribution formula, a smaller amount of money than their community college counterpart.

Secondly, some of the questions required different types of responses in the 1987 survey, thus some direct comparisons with the 1983 study were difficult. However, it was generally agreed by staff that the 1987 questions were better indicators of impact than the previous ones.

Finally, the information reported herein was based on data supplied by the individual institutions that received funds under Act 1984-107. The data for the most part were best estimates by designated individuals (teachers or administrators) at each institution. It was apparent to the researcher that there was no systematic procedure for inventorying, valuing, depreciating and replacing equipment at most of the institutions.

Question 1 - Did the nature and extent of comprehensive planning for obtaining the tools and equipment used in vocational programs change with the infusion of Act 1984-107 funds?

The results from the 1987 survey did not substantiate any change in the way the public educational institutions replace and update their vocational tools and equipment. Local governing boards still control the purse strings and, therefore, expenditures for tools and equipment simply become another item that must be considered in preparing the annual institutional budget. In fact, more institutions were using local budgets to replace vocational education tools and equipment in 1987 than in 1983.

The area vocational-technical schools and comprehensive high schools were most likely to use the above system. Community colleges, while less in number, used the availability of funds as the primary criterion for replacing vocational education tools and equipment. This was a slight change from 1983 and may be indicative of the funds received from Act 1984-107.

The sources of funds analysis for vocational education tools and equipment only verified the above. Most of the institutions used the annual budget to secure funds for vocational education tools and equipment. Thus, proposals were made annually to the respective governing bodies. This approach also

limits replacement to available funds and the prioritization of items in the institutional budget.

It was noteworthy that the second most often cited source of funds was Act 1984-107. This indicated that in short term these monies replaced some of the federal sources cited in 1983.

Question 2 - Did selected aspects of vocational education tools and equipment acquisition and utilization change with the allocation of Act 1984-107 funds?

During the three-year period of the legislation a $68 million increase occurred in the value of vocational education tools and equipment. Act 1984-107 pumped $27 million into the funding stream during its legislative life. Obviously, additional monies also funneled into the effort. While the area vocational-technical schools had the highest total valuation, it was the community colleges that showed the greatest increase over 1983. This again reflects the previous observation that the community colleges were moving into the higher capitalization programs. The comprehensive high schools also showed an increase in total valuations. Since these institutions received relatively small amounts from other sources, one can speculate that Act 1984-107 funds had a positive impact.

As was noted earlier, the area vocational-technical schools received large amounts of money when they were being built. The data indicated that most of the tools and equipment in these facilities in 1987 were over 10 years old and/or obsolete. Indicative of the community colleges' recent entry into the high capitalization program areas was their lower incidence of older tools and equipment. While most of the tools and equipment in the community colleges were less than 10 years old, apparently a large amount of them were obsolete. This could be reflective of these institutions moving toward high technology programs. The area vocational-technical schools and comprehensive high schools appeared to have less of a problem with obsolete equipment. However, across all the institutions the percentages were program specific; that is, the high capitalization programs seemed to have the highest percentage of older and obsolete tools and equipment.

In question 1 it was noted that most vocational education tools and equipment were acquired through an annual institutional budget item. All three types of institutions showed significant increases in their annual budgets for tools and equipment over the three-year study period. While the area vocational-technical schools had the highest total annual budgets, community colleges and comprehensive high schools had greater annual increases over the study period.

One of the major thrusts of Act 1984-107 was the updating of vocational education tools and equipment. To this end, the legislation seemed to have only minimal effect since the 1983 appropriation of $27 million was slightly over one-half the estimate of $45 million needed to bring equipment up to industry standards. The magnitude of the problem is evident when one couples inflation with rapidly changing technologies (and the inherent increased cost of equipment) and less federal support. The 1987 estimate of $70 million needed to bring equipment up to industry standards indicated that in one sense the Commonwealth actually lost ground since the passage of Act 1984-107.

Another consideration in ascertaining the status of vocational education tools and equipment was the value of private sector contributions. As the data indicated, private sector involvement nearly doubled over the three-year period. However, the 1987 figure is still only about $4 million.

Another reason for the passage of Act 1984-107 was the desire by the legislature to utilize institutions offering vocational-technical programs as a vehicle for providing advanced technology training in the Commonwealth. The two measures of the advanced technology implementation were the current value of equipment and estimated startup costs. While no individual program breakout was done in 1983, the totals did show a very significant increase over the three-year period. This was especially true in the community colleges and comprehensive high schools. The area vocational-technical schools apparently were already doing training in some of the advanced technologies as their total showed a relatively small increase.

A significant factor in the implementation of high technology programs was the amount of Act 1984-107 money received per institution. The act legislated that 45 percent go to community colleges and 55 percent for area vocational-technical schools and nonparticipating school districts. The allocation breakout (Appendix B) showed the community colleges received substantially more per institution than either the area vocational-technical schools or the comprehensive high schools. Thus, the community colleges were able to develop advanced technology centers at their institutions, but the other institutions could not.

The Trade and Industrial Education and Technical Education program areas again seemed to benefit the most from the influx of equipment monies. It seemed reasonable to assume that the advanced technologies clustered in these two program areas.

What does it cost to start advanced technology programs? According to the survey, it is expensive. The overall estimate of nearly $39 million was almost four times the 1983 figure. Interestingly, the three types of institutions were not very much different in their estimates. It appeared that large amounts of monies would be necessary to implement these programs in all institutions.

What can be said about the impact of the legislation from the fiscal characteristics cited above? It seemed clear that the funds did impact upon vocational-technical education. For example, total value increased by about two-thirds, annual local budgets doubled and the value of advanced technology equipment nearly tripled.

Question 3. Did Act 1984-107 funds stimulate an increase in the infusion of specific technological advancements into vocational education programs?

If the fiscal information cited above was a reflection of advanced technologies implementation, then there has been an increase. However, the specific technology results relative to the question provided a different perspective. In other words, there appeared to be a relatively large number of institutions not using the advanced technologies.

Across the three types of institutions the advanced technologies planned or developed for implementation most frequently were robotics, word processing, microprocessors and CAD/CAM. Electromechanical seemed to occur most frequently in the comprehensive high schools and area vocational-technical schools, while telecommunications was most likely implemented in community colleges. One would speculate that the availability of the necessary facilities had a great deal to do with advanced technologies implementation. For example, the area vocational-technical schools and these departments in comprehensive high schools would have the shop/laboratory facilities to implement several technologies into ongoing programs. Facility changes would not be as disruptive or costly as might be the case in community colleges. However, these latter institutions appeared to have the wherewithal to implement some of the softer technologies such as word processing, microprocessors, laser technology and CAD/CAM. These latter technologies did not require the "heavy" shop/laboratory facilities required of other technologies. Community colleges are beginning to subcontract with the area vocational-technical schools to offer advanced technologies currently unavailable on their own campuses.

Another point of discussion emanating from the data was the increase reported in the lower usage categories; that is, "some use" and "slight use." These usage categories indicated most institutions had in fact increased their implementation of advanced technologies. While the institutions were unable to implement individual programs in the technologies, they were able to integrate some aspects of them into current offerings.

Conclusions

The survey results and discussion thereof warranted the following conclusions:

- No change has taken place in the way public education agencies replace and update their vocational education tools and equipment; that is, any purchases must be considered in the context of competing with every other expenditure in the institution's annual budget.

- Act 1984-107 funds in many institutions were used to replace monies lost through federal cutbacks.

- The $27 million appropriated under Act 1984-107 was about $18 million less than the 1983 "need" estimate of over $45 million. The 1987 estimate even after Act 1984-107 was $70 million.

- Private sector involvement via contributions of funds or equipment nearly doubled during the life of Act 1984-107. However, their $4 million contribution was overshadowed by the $70 million "need" estimate in 1987.

- Fiscally, it appeared that large amounts of Act 1984-107 funds were spent for advanced technology programs. However, implementation data were less conclusive relative to the impact of the funds.

APPENDIX A

VOCATIONAL EDUCATION TOOLS AND EQUIPMENT INVENTORY (FOLLOW-UP)

_____ _____
Institution Vocational Director

_____ Title of Person Completing Questionnaire (if other than director)

Instructions: Respond to the following questions about the tools and equipment required to provide vocational education in your institution. For the purpose of this follow-up, tools and equipment include both fixed and portable items.

1. What type of system or process is used to replace and/or update tools and equipment required to provide vocational education in your institution? (Check one)

___ Tools and equipment are depreciated and replaced on an established schedule.

___ As new or replacement equipment is required, proposals are made to the governing board.

___ Tools and equipment needs are prioritized and replacement occurs when funds are available.

___ Other (specify) _____

_____

2. How does your institution fund the cost of replacing and/or updating the tools and equipment required to provide vocational education in your institution? (Check primary source)

___ A line item in the annual operating budget.

___ A special tools and equipment fund.

___ Leftover funds at the end of the fiscal year.

___ State funds (Act 107).

___ State funds (other than Act 107).

___ Federal funds (VOED, JTPA, etc.).

___ Equipment loan from the Department of Defense through the National Equipment Industrial Reserve (NEIR) program.

___ Private sector contributions, loans, donations, etc.

___ Other (specify) _____

_____

3. What percentage of the tools and equipment needs required to offer vocational education is presently being met at your institution? _____

4. What percentage of tools and equipment costs is paid by:

___ Local school districts?

___ Act 107 funds?

___ Other state funds?

___ Federal funds (VOED, JTPA, etc.)?

___ Private sector contributions?

___ Other (specify) _____

Use your experience and other available data to answer the following questions. If insufficient data is available to answer a question, mark an "X" in the appropriate program space. Round all dollar amounts to nearest thousands (Example: $165,523. to $166).

	Vocational Program Area							
	Agriculture	Business	Marketing and Distributive Education	Health	Home Economics	Trade and Industrial Education	Technical	TOTAL
5. What is the estimated total current value of the tools and equipment in each vocational program area? (The present inventory value or estimate thereof.)	$	$	$	$	$	$	$	$
6. What percentage of the tools and equipment are over 10 years old in your institution?	%	%	%	%	%	%	%	%
7. What percentage of the tools and equipment is obsolete in your institution? (No longer current with industry requirements.)	%	%	%	%	%	%	%	%
8. What is the dollar value of the annual tools and equipment budget?	$	$	$	$	$	$	$	$
9. What would be the cost to bring the tools and equipment in your institution up to business and industry standards?	$	$	$	$	$	$	$	$

BEST COPY AVAILABLE

	Vocational Program Area							
	Agriculture	Business	Marketing and Distributive Education	Health	Home Economics	Trade and Industrial Education	Technical	TOTAL
10. What is the dollar value of private sector contributions of tools and equipment in your institution?	$	$	$	$	$	$	$	$
11. What dollar value recorded in Question 9 would you estimate was needed for the advanced technology programs (see Question 13 for list) currently offered at your institution?	$	$	$	$	$	$	$	$
12. What is the estimated dollar value of tools and equipment needed to support the startup of advanced technology programs over the next three years?	$	$	$	$	$	$	$	$

13. To what extent has the following technology been incorporated in your vocational programs? (Circle the appropriate response)

1 = None

2 = Slight use in ongoing/existing programs

3 = Some use in existing programs

4 = Extensive use in existing programs (current with business and industry use)

5 = New program developed in this area

6 = New program being planned or considerd in this area

	Technology	In Existing Program: Not Using	In Existing Program: Slight Use	In Existing Program: Some Use	In Existing Program: Extensive Use	New Program Developed	New Program Planned
1.	Energy Saving Devices and/or Alternative Forms of Energy	1	2	3	4	5	6
2.	Robotics	1	2	3	4	5	6
3.	Microprocessors	1	2	3	4	5	6
4.	Word Processing	1	2	3	4	5	6
5.	Laser Technology	1	2	3	4	5	6
6.	Fiber Optics	1	2	3	4	5	6
7.	Computer-Assisted Design (CAD) and/or Computer-Assisted Manufacturing (CAM)	1	2	3	4	5	6
8.	Electromechanical	1	2	3	4	5	6
9.	Biotechnology	1	2	3	4	5	6
10.	Specialized Materials	1	2	3	4	5	6
11.	Telecommunications	1	2	3	4	5	6
12.	Medical/Scientific Devices	1	2	3	4	5	6
13.	Other _____	1	2	3	4	5	6
14.	Other _____	1	2	3	4	5	6

APPENDIX B

PARTICIPATING EDUCATION AGENCIES SHOWING ALLOCATIONS
AND EXPENDITURES THROUGH JANUARY 1988

Area Vocational-Technical Schools

Agency Name	Allocation	Expenditure*
Admiral Peary	$ 128,556	$ 128,556
Altoona	308,000	308,000
A. W. Beattie	142,914	142,914
Beaver County	208,646	208,646
Bedford-Everett	41,317	41,317
Berks County	254,991	**
Bethlehem	163,148	163,136
Bradford County	90,268	89,945
Bucks County	274,317	**
Butler County	154,727	154,727
Carbon County	88,511	88,511
Central Chester County	158,423	158,414
Central Montgomery County	176,537	176,537
Central Westmoreland County	275,044	275,044
Centre County	157,575	157,575
Clarion County	91,600	91,600
Clearfield County	113,834	**
Columbia-Montour	133,584	133,584
Crawford County	163,693	163,693
Cumberland-Perry	325,024	299,660
Dauphin County	195,984	195,984
Delaware County	404,387	341,218
Eastern Montgomery County	158,605	158,605
Eastern Northampton County	117,227	117,227
Eastern Westmoreland County	122,316	121,448
Erie County	282,617	**
Fayette County	132,554	132,554
Forbes Road East	282,919	282,919
Franklin County	315,028	315,028
Greater Johnstown	298,913	298,913
Greene County	49,556	49,220
Harrisburg-Steelton-Highspire	57,977	57,977
Hazleton	102,929	102,929
Huntingdon County	106,201	106,201
Indiana County	104,747	104,747
Jefferson County-DuBois	103,293	103,293
Juniata-Mifflin County	109,654	**
Keystone Central	40,045	40,045
Lackawanna County	241,542	241,542

*Rounded to the nearest dollar.
**Account open pending receipt of Final Expenditure Report.

Agency Name	Allocation	Expenditure*
Lancaster County	$ 556,630	$ 556,630
Lawrence County	167,752	167,647
Lebanon County	229,728	**
Lehigh County	383,607	**
Lenape	100,930	75,661
McKeesport	42,343	29,590
Mercer County	171,387	171,387
Middle Bucks County	236,210	230,275
Monroe County	199,498	199,498
Mon Valley	98,446	98,446
North Fayette County	69,124	**
North Montco	146,730	146,730
Northern Chester County	117,469	117,469
Northern Westmoreland County	94,206	**
Northumberland County	76,152	76,091
Parkway West	188,048	188,048
Reading-Muhlenberg	145,700	145,700
Schuylkill County	271,954	271,954
Seneca Highlands	47,739	**
Somerset County	142,853	142,852
Steel Center	196,408	196,408
SUN	123,224	123,224
Susquehanna County	4,665	**
Upper Bucks County	104,505	104,373
Venango County	149,214	149,214
Warren County	100,021	99,582
West Side	116,560	116,092
Western	93,842	93,842
Western Montgomery County	94,751	**
Wilkes-Barre	169,812	168,752
Williamsport ACC (Secondary)	102,687	102,687
York County	345,440	147,480
Community Colleges		
Allegheny County	$ 2,522,340	$ 2,513,111
Beaver County	623,295	623,295
Bucks County	895,455	**
Butler County	362,070	361,691
Delaware County	872,370	866,802
Harrisburg Area	771,525	771,525
Lehigh County	574,695	460,489
Luzerne County	544,320	544,320
Montgomery County	795,825	786,224
Northampton County	643,950	**
Philadelphia	1,399,680	1,399,680
Reading Area	257,580	**
Westmoreland County	746,010	746,010
Williamsport Area	1,140,885	1,140,885

*Rounded to the nearest dollar.
**Account open pending receipt of Final Expenditure Report.

School Districts

Agency Name	Allocation	Expenditure*
Abington Heights	$ 10,965	$ 10,629
Bermudian Springs	10,299	10,299
Bethel Park	32,351	32,351
Blue Ridge	15,630	**
Bradford Area	38,470	38,470
Cameron County	3,211	**
Carlisle Area	59,492	**
Central Fulton	10,844	10,844
Chestnut Ridge	16,842	16,842
Clarion-Limestone Area	9,633	9,633
Conewago Valley	19,871	19,871
Coudersport Area	11,995	11,995
Delaware Valley	22,597	22,597
Erie City	138,491	138,491
Fairfield Area	8,360	8,358
Farrell Area	7,542	7,452
Forbes Road	2,787	**
Galeton Area	3,635	3,635
Gettysburg Area	28,716	28,703
Harmony Area	3,150	3,147
Johnsonburg Area	9,996	9,996
Kane Area	17,084	17,084
Karns City Area	4,847	4,847
Lackawanna Trail	7,270	**
Littlestown Area	13,268	**
Loyalsock Township	3,271	**
Millersburg Area	2,242	**
Milton Area	23,688	23,688
Moniteau	11,511	11,511
Montrose Area	12,843	12,843
Mountain View	7,330	7,330
Muncy	6,179	6,179
North Clarion County	7,270	7,255
Northern Bedford County	23,203	23,203
Northern Cambria	4,665	4,665
Northern Tioga	12,419	12,398
Old Forge	4,423	4,423
Penns Manor Area	7,088	7,088
Philadelphia City	1,825,406	1,825,406
Pittsburgh	387,545	385,858
Pottstown	49,980	49,980
Purchase Line	13,328	13,324
Ridgway Area	7,149	**
Salisbury-Elk Lick	4,786	4,786
Sharon City	7,815	7,815

*Rounded to the nearest dollar.
**Account open pending receipt of Final Expenditure Report.

Agency Name	Allocation	Expenditure*
Slippery Rock Area	$ 4,725	$ 4,715
Smethport Area	4,544	**
Southern Fulton	12,722	12,722
Southern Tioga	5,331	5,306
St. Marys Area	6,725	6,643
Susquehanna Community	5,392	5,387
Tunkhannock Area	23,082	**
Tussey Mountain	3,150	3,150
Tyrone Area	20,174	20,174
Union	3,332	3,332
Upper Adams	11,147	11,051
Upper Dauphin Area	17,084	**
Wallenpaupack Area	9,148	9,148
Wayne Highlands	8,057	8,057
Wellsboro Area	9,996	9,996
Western Wayne	9,390	9,240
GRAND TOTAL	$26,998,324	$22,607,290

Act 1984-107 Allocations and Expenditures
by Type of Institution

Type of Institution	N	Total Allocation	Total Expenditure	Per Institution Allocation	Per Institution Expenditure
AVTSs	71	$11,764,838	$ 9,471,341	$165,702	$133,399
CCs	14	$12,150,000	$10,214,032	$867,857	$729,574
SDs	61	$ 3,083,486	$ 2,921,917	$ 50,549	$ 47,900
Combined	146	$26,998,324	$22,607,290	$184,920	$154,844

*Rounded to the nearest dollar.
**Account open pending receipt of Final Expenditure Report.

APPENDIX C

PENNSYLVANIA DEPARTMENT OF EDUCATION
333 MARKET STREET
HARRISBURG, PA 17126-0333

July 17, 1987

Dear Administrator:

During the past three years your institution has been given funds for updating its equipment to make vocational-technical programs more industry relevant. The funds were authorized under Act 1984-107 which provided for:

> "Establishing a program within the Department of Education for the acquisition of new vocational-technical equipment and the upgrading of existing vocational-technical equipment that is necessary to provide secondary, postsecondary and adult students with relevant occupational training; providing for allocations and grants of money; and making a nonlapsing appropriation."

Section 7(c) of Act 1984-107 required an impact survey upon termination of the Act (June 30, 1987). The purpose of the survey was to update a report entitled Vocational Education Tool and Equipment Inventory. The revised report will be used to inform the General Assembly of the impact which this Act has had on bringing the equipment used in vocational-technical programs up to industry standards.

Your completion of the enclosed form in an expedient manner will help the Department meet its obligation to the General Assembly. The completed form should be returned by August 17, 1987 to:

> Dr. Clarence A. Dittenhafer
> Research, Evaluation and Data Management
> Pennsylvania Department of Education
> 333 Market Street, 6th Floor
> Harrisburg, PA 17126-0333

If you have any questions or need additional information, please call me at (717) 783-6867.

Sincerely,

Clarence A. Dittenhafer

Clarence A. Dittenhafer
Research Associate
Research, Evaluation and Data Management
Bureau of Vocational and Adult Education

CAD/dlr
Enclosure

APPENDIX D

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF EDUCATION
333 MARKET STREET
HARRISBURG, PA 17126-0333

September 4, 1987

On July 17, 1987 you were sent a letter asking for your assistance in providing information about the impact of funds under Act 1984-107. These funds were provided to your institution as part of a statewide effort to acquire and update vocational-technical equipment, thereby making these programs more industry relevant.

Section 7(c) of Act 1984-107 required an impact study upon expiration of the Act (June 30, 1987). My July letter included a survey form to collect the necessary information. The original return date was August 17, 1987.

To date, I have not received a completed survey from your institution. It is rather important to furnish the information required by the legislation. I am requesting that you submit the completed survey as soon as possible but no later than September 21, 1987. After that date I will compile the information for the legislature. The names of institutions not completing the survey will be listed in an appendix to the report.

If you have any questions or need additional information, please contact me at (717) 783-6867.

Sincerely,

Clarence A. Dittenhafer
Research Associate
Research, Evaluation and Data Management
Bureau of Vocational and Adult Education

CAD/g6393